Notice of Allowability	Application No.	Applicant(s)	
	10/575,247	LUI, GE MING	
	Examiner	Art Unit	
	ALLISON M. FORD	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *telephonic interview of 12/10/2010*.

2. ☒ The allowed claim(s) is/are *40,42-44,46-49,59-62 and 65-75*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20101206* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Allison M. Ford/
Primary Examiner, Art Unit 1651

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Joseph Contrera on 12/10/2010.

The following version of claims are allowed:

1-39. (cancelled)

40. (Amended) A cell culture substrate,~~n improved surface for the growth and attachment of cells~~ comprising a biodegradable biopolymer coated with hydrogen free diamond-like carbon, wherein cells can attach to and grow on the surface of the hydrogen free diamond-like carbon~~ and wherein the biopolymer is biodegradable~~.

41. (Cancelled)

42. (Amended) The cell culture substrate ~~improved surface~~ of claim 40, wherein the biopolymer is in a sheet form.

43. (Amended) The cell culture substrate ~~improved surface~~ of claim 40, wherein the biopolymer is in micro particle form.

44. (Amended) A method of growing neurons in culture comprising:

providing the cell culture substrate of claim 40;

[[the]]seeding neurons onto the hydrogen free diamond-like carbon; and

culturing ~~growth of~~ the neurons ~~on a biopolymer coated with a high quality, hydrogen free diamond-like carbon surface~~.

45. (Cancelled)

46. (Previously Presented) The method of claim 44, wherein the biopolymer is in sheet form.

47. (Previously Presented) The method of claim 44, wherein the biopolymer is in micro particle form.

48. (Amended) The cell culture substrate ~~improved surface~~ of claim 40, wherein the biopolymer has embedded or incorporated into it during its synthesis[[, an]] one or more attachment reagents ~~comprising one or more of the following~~ selected from the group consisting of: laminin, fibronectin, RGDS (SEQ ID NO: 1), basic fibroblast growth factor (bFGF) conjugated with polycarbophyll, epidermal growth factor (EGF) conjugated with polycarbophyll, and heparin sulfate.

49. (Amended) A method of growing neurons in culture comprising:

providing the cell culture substrate of claim 48;

[[the]] seeding neurons onto the hydrogen free diamond-like carbon; and

culturing ~~growth of~~ the neurons ~~on a biopolymer made using the method of claim 48~~.

50-58. (Cancelled)

59. (Amended) A three dimensional cell culture substrate ~~growth medium suitable for supporting the growth and replication of neural cells~~ comprising a semi-solid biopolymer ~~which is capable of supporting neuronal cell growth~~ coated with Diamond-Like Carbon, wherein the biopolymer is comprised of chitosan or sodium alginate, and wherein neural cells can attach to and grow on the surface of the Diamond-Like Carbon.

60. (Amended) The cell culture substrate ~~growth medium~~ of claim 59, wherein the biopolymer has embedded or incorporated into it during its synthesis[[, an]] one or more attachment reagents ~~comprising one or more of the following reagents~~ selected from the group consisting of: laminin, fibronectin, RGDS (SEQ ID NO: 1), basic fibroblast growth factor (bFGF) conjugated with polycarbophyll, epidermal growth factor (EGF) conjugated with polycarbophyll, heparin sulfate, and nerve growth factor (NGF), in an amount sufficient to allow neural or nerve cells transplanted onto the growth medium at low density to proliferate and send out neural processes.

61. (Amended) The cell culture substrate ~~growth medium~~ of claim 60, wherein said biopolymer is shaped into beads, sheets or micro-particles.

62. (Amended) A method of transplanting neurons to a recipient [[host]] comprising:

providing the three dimensional cell culture substrate of claim 60;

seeding [[of the]] neurons of interest onto the diamond-like carbon ~~into the growth medium of claim 60,~~;

allowing the neurons to grow to sufficient density[[,]]; and

~~implantation of~~ implanting the neurons on ~~within~~ the cell culture substrate~~growth medium~~ into said [[host]] recipient.

63-64. (Cancelled)

65. (Amended) A three dimensional cell culture substrate ~~growth medium suitable for supporting the growth and replication of neural cells~~ comprising a semi-solid biopolymer ~~which is capable of supporting neuronal cell growth which is~~ coated with bovine corneal epithelial cell-extracellular matrix (BCE-ECM) and the BCE-ECM is further coated with Diamond-Like Carbon, wherein neural cells can attach to and grow on the surface of the Diamond-Like Carbon.

66. (Amended) The cell culture substrate ~~growth medium~~ of claim 65, wherein the biopolymer is comprised of chitosan or sodium alginate.

67. (Amended) The cell culture substrate ~~growth medium~~ of claim 65, wherein the biopolymer has embedded or incorporated into it during its synthesis[[, an]] one or more attachment reagents ~~comprising one or more of the following reagents~~ selected from the group consisting of: laminin, fibronectin, RGDS (SEQ ID NO: 1), basic fibroblast growth factor (bFGF) conjugated with polycarbophyll, epidermal growth factor (EGF) conjugated with polycarbophyll, heparin sulfate, and nerve growth factor (NGF), in an amount sufficient to allow neural or nerve cells transplanted onto the ~~growth medium~~ substrate at low density to proliferate and send out neural processes.

68. (Amended) The cell culture substrate ~~growth medium~~ of claim 67, wherein said biopolymer is shaped into beads, sheets or micro-particles.

69. (Previously presented) A laboratory apparatus having a coating suitable for inducing the growth and attachment of cells, the apparatus having an inside and outside surface, wherein the inside surface is the surface in contact with cells and cellular media and the inside surface of said apparatus is coated with a film of Diamond-like-Carbon layered over a biopolymer coating.

70. (Amended) The apparatus of claim 69, wherein the apparatus is selected from the group consisting of cell culture dishes, petri dishes, tissue culture flasks, plates, bottles, slides, filter chambers, slide chambers, roller bottles, harvesters and tubing.

71. (Amended) A laboratory apparatus having a coating suitable for inducing the growth and attachment of cells, the apparatus having ~~comprising~~ an inside surface and an outside surface, wherein the inside surface is the surface in contact with cells and cellular media and the inside surface of said apparatus is coated with a film of Diamond-like-Carbon, the Diamond-like-Carbon being layered over a biopolymer coating and at least one other coating.

72. (Previously Presented) The apparatus of claim 71, wherein the at least one other coating is an extracellular matrix.

73. (Previously Presented) The apparatus of claim 72, wherein the coating is BCE-ECM.

74. (Amended) A method of making a laboratory apparatus suitable for inducing the growth and attachment of cells, ~~wherein the laboratory apparatus has an inside surface and an outside surface, and wherein the inside surface is in contact with cells and cellular media of said apparatus,~~ the method comprising:

a) obtaining ~~the apparatus~~ a laboratory apparatus having an inside surface and an outside surface, wherein the inside surface is to be in contact with cells and cellular media;

b) applying to [[an]]the inside surface of the apparatus a biopolymer coating; then

c) applying a film of Diamond-like-Carbon over the biopolymer coating.

75. (Amended) The method of claim 74, further comprising ~~applying to the inside surface of said apparatus after step b)~~, between steps b) and c), step b') applying at least one other coating over the biopolymer coating~~, and then applying to the inside surface of said apparatus a film of Diamond-like-Carbon~~.

76-80. (Cancelled)

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

The instant claims are directed to cell culture substrates wherein a diamond-like carbon (DLC) coating is present over a biopolymer material. The DLC and biopolymer material are further limited in various claims, but in all claims the DLC surface must be exposed for cell contact (i.e. the DLC cannot be sandwiched in between two layers such that cells would not be able to be in direct contact with the DLC). In use, cells are seeded onto the DLC surface of the substrate, not onto the biopolymer. While it was known in the art that cells could grow on DLC-coated surfaces (see, e.g. Lu et al, Bio-Medical Materials and Engineering, 1993 (of record)), when the DLC-coated surfaces were combined with an additional biopolymeric material (such as laminin, fibronectin, collagen, alginate, etc) the art taught it was the DLC which was coated/modified with the biopolymeric material, and cells were seeded onto the biopolymer surface, not onto the DLC (See, e.g. Ignatius et al, Journal of Biomedical Material Research, 1998; Brown et al, US 2004/0219184 A1; especially Fig. 1, described at ¶0028). Because DLC must be applied to an

existing substrate, when combined with a biopolymeric material as taught in the prior art, the order would be: substrate→DLC→biopolymer, with the cells being seeded onto the biopolymer, in such formation the DLC is sandwiched in between two layers, and a surface of the DLC was not exposed for cell contact.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALLISON M. FORD whose telephone number is (571)272-2936. The examiner can normally be reached on 8:00-6 M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allison M. Ford/

Primary Examiner, Art Unit 1651